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SELECTED TRANSLATIONS ON EAST EUROPEAN HEAVY INDUSTRY (4)

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## FOREWORD

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SELECTED TRANSLATIONS ON EAST EUROPEAN HEAVY INDUSTRY (4)

INTRODUCTION

This is a serial publication containing selected translations on the manufacturing and chemical industries in Eastern Europe.

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EXPORT SHIPMENTS -- OPINIONS AND SUGGESTIONS  
FROM THE V. I. LENIN WORKS IN PLZEN, CZECHOSLOVAKIA

Following is the translation of an article by Eng Oldrich Ohlidka in Hospodarske Noviny, No 19, Prague, 12 May 1961, page 8.7

The national plan for foreign trade for the Third Five-Year Plan calls for increased production tasks in the entire machine industry. In the fulfillment of these tasks the V. I. Lenin Works in Plzen will participate on a larger scale than before. The public has learnt from the article by State Minister Krajcir, "Foreign Trade in the Third Five-Year Plan" (Hospodarske Noviny, No 4), that the production of the entire machine industry of the CSSR, including finished projects, will increase by more than 75% during the Five-Year Plan and that the volume of shipments of machinery and equipment for foreign trade will be almost doubled. The Lenin Works will contribute to the fulfillment of this task by increasing their volume 68.5% by 1965. The volume of complete shipments for foreign trade (including partial shipments and commercial articles) will increase 90%. The share of export shipments in the total volume of the machine production of the Lenin Works in Plzen has already reached approximately 50%; in the course of the Third Five-Year Plan, further growth is planned.

The export of steam turbines will increase 82% by 1965 over 1960; the export of mobile power stations utilizing steam or natural gas by 21% (these are manufactured almost exclusively for export); the export of rolling-mill equipment by 133%; fuel furnaces 200% over 1961 (in 1960 they were not exported). The export of metal-working machines will increase in the Third Five-Year Plan by 83%, tobacco-industry machines by 220%, and electric engines by 117%. In the Third Five-Year Plan our plant will also manufacture rubber-industry machines, chiefly for export. The total volume of our economic main supply production units (steam-power establishments, mobile power stations, coal-processing plants, complete equipment for rolling-mills, etc.) will increase in the Five-Year Plan by 55%. The above figures do not include shipments for the new metallurgical combine at Ranchi in India, which, after construction has been completed (it will be accomplished in three stages), will employ 20,000 people working in the cast-iron foundry, steel foundry, forge, rough-work turnery, and auxiliary shops. By means of agreements with foreign trade corporations, the Lenin Works have secured export orders for 46 European and overseas countries.

The export of the products of the Lenin Works to the countries of the world socialist system is secured with long-term international agreements with the socialist countries. At the same time, exports to

the capitalist countries are expected to increase; a considerable part of this increase will go to the economically developing countries.

The variety of our export products will be increased during the Third Five-Year Plan; several new products will be introduced into normal production after a thorough testing of prototypes upon which the results of research and development projects have been realized. They are, primarily, a mobile power station with a gas turbine, electrical engines utilizing alternating current, and new types of metal-working and tobacco-industry machines.

### Securing the Planned Tasks

To fulfill the increased tasks of the Third Five-Year Plan in general and especially for export, a number of problems must be solved. First of all, it will be necessary, within the framework of the national plan of foreign trade and in cooperation with the Strojimport, Strojexport, Kovo, Motokov, Ferromet, Metalimex, Cs. Keramika, and Chemapol foreign trade corporations, to provide for the increased importation of material-technical supply commodities, metallurgical and non-metal materials, and machines and equipment. This must be done in accordance with the increased volume of production and the expansion of specialization and cooperation with the member countries of the Council of Mutual Economic Assistance. The growth of production will take advantage especially of the stepped-up import of raw iron, melioration admixtures, metal alloys, nonferrous metals, and metal scrap for our foundries and steel works. Also included are the requirements for the importation of rolled and malleable materials, including sheets, pipes, and other metallurgical products; instrument steels, special types of roller bearings, armatures, insulating materials, instruments, apparatuses, and machines for special purposes. It will be necessary to increase the import of the machines and equipment which we need for the completion of shipments and the modernization of our production but which are not manufactured in this country or which will be discontinued on the recommendation of the Permanent Machinery Committee of the Council of Mutual Economic Assistance. The necessary import from the capitalist countries and its possible increase must be offset by an increased export to the respective currency areas.

Note: The caption of the picture which follows the above paragraph reads: "Metal-working Machines Department in the Precision Machinery Plant. In the course of the Third Five-Year Plan the V. I. Lenin Works will expand the export of metal-working machines by 83%." End of note.

The purchase sources of fine and glossy sheets, which we have been buying in considerable amounts from the capitalist countries, will shift in the Third Five-Year Plan to the countries of the socialist camp in which the capacity of the present rolling-mills will be enlarged and new plants added. The production of thick sheets will be increased by the end of the Third Five-Year Plan even in Czechoslovakia after developing the rolling-mills in Vitkovice and Liskovec. Through the expansion

and construction of metallurgical works in this country and in other socialist countries, an improvement of the situation in other types of rolling material has been noted; for example, the demand for rod and casting steels could not be covered by domestic production or import from allied countries, thus they had to be imported until recently also from capitalist countries. The Austrian steel-works, however, have been saturated with orders for a long time and refuse new ones or offer too long delivery terms. We may nevertheless count upon satisfying the growing demand for high-speed cuttable steels in the near future with shipments from Korea, from where we have already received a sample shipment of steel equivalent to our Poldi Maxim Special, produced by a new plant built with the assistance of the Soviet Union.

### Cutting Terms To Fill Requirements

The planned increase of the volume of production and constantly growing specialization and cooperation among the member parties of the Council of Mutual Economic Assistance (on the basis of a resolution and recommendation of the Permanent Machinery Committee) will require radical measures for a cut of the delivery terms, not only of partial shipments and commercial commodities for completion of technical outfits but also in other material-technical supply commodities. So far the foreign trade corporations have required a binding proposition of an economic agreement with detailed specification of the order at least nine months before the beginning of the year in which the shipment is to be realized. Thus the term of delivery of the final product is usually detained by another year.

For instance, for standard roller-bearings of larger dimensions and special roller-bearings of foreign origin (either from a country with planned economy or from a capitalist country), the Market Bureau for Roller Bearings requires that an order be submitted before 15 March so that the filing term prescribed by the corporation Kovo be complied with, and that an order with a delivery date for next year be acknowledged. Orders submitted after 15 March are acknowledged only in extraordinary cases and as a rule are returned with a comment that the import limit has been exhausted. The requirements for important export orders are only exceptionally accepted after the deadline, but only within the authorized financial limit.

Certain types of large and special bearings for piece- and small volume production in various fields may be ordered unconditionally in the first quarter for the next calendar year, but only those orders which are secured by agreements, technically cleared up, and solved as far as construction problems are concerned. To this category belong 60% of the total amount of bearings which we shall need in the following year for assembling the final product or the technical unit in question. For the remaining 40%, we usually do not have by March the necessary order specifications for the following calendar year; these, in case we happen to have available some parts of them, are not technically cleared up or technically processed, so that it may be possible unambiguously to derive



and determine the demand for certain types of bearings according to quantity and variety.

The long filing terms for the import requirements are no doubt justified by the need for a timely and economical securing of foreign currency for import from capitalist countries and for noting the production capacity in the countries with a planned economy. We are, however, convinced that for such purposes mere volume, unspecified values expressed in number of pieces according to the planning categories, as in preparation of capacity agreements with domestic suppliers, would suffice. The technically clear orders containing exact specifications of the required material could be then submitted within terms which would correspond to the filing terms of orders for domestic suppliers and adequately extended for orders from abroad before the beginning of each calendar quarter in which the delivery should be made. The present filing terms with the March deadline relating to the whole of the next year are not technically justified, especially in case of products of a mass character (e.g., small, standard bearings). In differentiating the terms for submitting import orders before each quarter, it is necessary to draw a line between small and medium articles of mass and one-series production, delivered in most cases from warehouses, piece products (e.g., special and large-size bearings), or products supplied by the Soviet Union and other countries of the Council of Mutual Economic Assistance.

We have no doubts that the foreign trade corporations as a whole will, in their own interest, study on their own initiative the possibilities of reducing the time of filing terms for partial deliveries, essential for completion of final products, and investment units in the agreed upon delivery terms. This would consequently facilitate the fulfilling of deliveries for domestic investors within the terms set by government projects and ministerial programs for centralized and decentralized projects. If the accurately specified orders could be submitted every quarter, a large part of special interventions, business trips, correspondence, and long-distance telephone calls could be eliminated. If the filing terms for orders of foreign roller bearings were changed to one year previous to the respective quarter, it would be possible to file technically specific orders for 90% of the import demand (instead of the present 60% in March for the entire following year); if it were nine months, the result would be practically 100%.

When our customers in the countries of the socialist camp complete our shipments with their own or domestic products, it would be practical in the first case that partial agreements concerning the shipments of such products be included in our agreement on the delivery of the technical unit or that such products be excluded from our agreement; in the second case, it would be practical for the foreign customer to order the necessary supplements directly from his domestic supplier.

The successful fulfillment of the tasks of foreign trade in export requires not only the securing of imports and the reduction of filing terms for import orders through marketing centers and foreign trade corporations, but also the improvement and better solidification of long-term international agreements, the timely application of the demands for export production, and the observation of our terms.

## THE PLASTIC MATERIALS INDUSTRY IN CZECHOSLOVAKIA

Following is the translation of an article by the Chamber of Commerce of Czechoslovakia in Technique et Commerce Est-Ouest (East-West Applied Science and Trade) Vol VII, No 34, Geneva, March 1961, pages 38-40.

The plastic materials industry occupies an increasingly important place in the economy of Czechoslovakia, as it does in every economy in the world. The constantly growing share of plastics in the world economy appears more striking if we compare their manufacture during the following years (in thousands of tons):

1900	1933	1945	1955	1956	1957	1958	1959
------	------	------	------	------	------	------	------

20	110	500	2900	3500	4000	4450	5000
----	-----	-----	------	------	------	------	------

The principal producer of plastic materials in Czechoslovakia has been GUMOV of Bratislava, which in 1910 began manufacturing phenolic resins and cold-molded materials. Almost at the same time, various factories began to treat celluloid, galalith, and later the so-called noble phenolic resins.

After the Second World War, Czechoslovakia had a rather large number of factories devoted to the molding and treatment of plastics. For the most part they were small enterprises which had sprung up at random during a period of favorable circumstances. There were only a few factories for the production of plastic materials, and these were poorly organized and without modern equipment or proper research laboratories capable of assuring future development. During the years following the war, several small treatment plants were merged to form larger units. At the same time new production enterprises were built, research was developed, and new products were manufactured, particularly polyamides (fibers), wire, pulps, caprolactam, methyl-acrylates, urea-base pastes and veneer resins. At present, polyvinylchloride and ion-exchangers are also produced.

The increased production of plastic materials in Czechoslovakia appears clearly in the following table (in tons):

1950	1955	1956	1957	1958	1959
------	------	------	------	------	------

10700	25000	35000	37350	47800	53500
-------	-------	-------	-------	-------	-------

More than 15 kinds of basic plastic materials are now fabricated in Czechoslovakia. Among the heat-resistant materials -- thermosets --

are phenoplasts, aminoplasts, unsaturated polyesters, resins for ion-exchangers, silicones, epoxides, and veneer resins. Among soluble plasticizers -- thermoplasts -- are polyvinylchlorides, polyamides, methacrylates, polystyrene materials, and others.

The increased production of the various products appears by comparing the figures for the preceding years:

	1957	1958	1959	tons
Phenoplasts	14342	17405	19690	"
Aminoplasts	6893	7366	9693	"
Polyvinyllic resins and polyvinylchlorides	4038	4913	6165	"
Cellulose derivatives	2404	3735	6069	"
Polymethylacrylates and polyacrylates	671	644	805	"
Ionex resins	402	490	648	"
Epoxide resins	256	392	416	"

Among phenoplasts, Czechoslovakia produce molding and laminated materials, and technical and veneer resins. The molding materials, especially technical molded pieces and technical parts for the electric industry, are fabricated in factories in Ostrava and Bratislava. The laminated materials are for technical requirements, for example in the making of coatings for furniture, walls, etc. One hundred percent pure uncharged liquid resins supply a wide range of colorings. Furniture buttons are turned out with the lathe, as well as various kinds of handles, office fittings, smokers' sets, fancy goods, costume jewelry, etc. The technical resins (mastics, pastes, adhesive sheets, acid-proof materials, faolite, etc.) are fabricated as binders for brake and clutch linings, grindstones, iron castings, granular bindings, mounting adhesives for cabinet makers, pastes for light-bulb sockets, etc.

Among amino-plasts are wood pastes, molding materials, and carbamides in clear pastel shades, with which articles of various kinds and parts for the electric industry are made, such as switches, plugs, and telephone parts. The veneer resins are used in the manufacture of special polishes for automobiles in pastel tones.

The manufacture of unsaturated polyesters is concentrated at PLASTIMAT in Prague and GUMOV in Bratislava. They are used especially in the preparation of non-dissolving varnishes for the furniture industry and are remarkable for their hardness of surface and the cheapness of ingredients. One coat does the work of three to five coats of nitro-lac. Bonding resins and plated glass for roofing are also produced. The Czechoslovak pavillions at Brussels, Colombo, and Calcutta were covered with plated glass. Unsaturated polyesters are also used in the furniture industry for various interior sets, for body parts in the automobile industry, and for trailers, side-cars, boats, and various consumer articles.

The ion-exchange resins (ionexes) form a special group of plastic materials called synthetic resins. They are basically of two types, polycondenser and polymer, which are divided into ionexes and catexes. They are used in the power industries for de-scaling water lines, in the

sugar industry for blanching syrup, in chemistry, in the pharmaceutical industry, in the food production industry, in smelting etc.

Among silicones are silicone oils, brake fluids, varnishes, emulsions, hydro-fibrous materials, and others. Among the epoxides are wire polishes, corrosion-proof coats, metal pastes, bonding materials, and color suspensions. The largest producer of veneer resins is the chemical and Metallurgical Production Company. Its selection of articles is very extensive and includes esters, cellophanes, numerous types of alkyd resins, modified phenol resins, dianic condensates, novolak and resolvent resins of the maleinate type, combined polyamido-phenol resins, and a number of others.

Polyvinylchloride is manufactured in several varieties, distinguished by their molecular weight and therefore also by their K value. A paste type is also now being produced. Among the PVC are conveyor belts for the mining industry, various armatures, micro-porous separators for batteries, tubes, floor coverings, and a large selection of consumer textile articles, such as fabrics for curtains, tablecloths, raincoats, rubbers, plastic films, toys, etc.

The technique for the manufacture of polyamides is a Czechoslovak specialty and has reached world proportions. The caprolactam type in particular is produced, known by the trade name of "silon." Caprolactam is used in the manufacture of spray-gun varnishes, gear wheels, fishing lines, instrument strings, artificial horsehair, foil, gear boxes, various armatures, different technical parts for the radio industry, and consumer articles. The Czechoslovak method for manufacturing large blocks of polyamide is new, facilitating the production of very large machine parts and heavy construction components, such as ship hulls.

Among methacrylates is polymethyl-methacrylate, the most important of which is organic glass. Spray-gun varnishes, paints, emulsions for finishing textiles, and coatings for natural and artificial skins are also manufactured.

Polystyrene materials are of two types: molding and nonmolding. They are used particularly in the refrigeration industry, in plane construction and shipbuilding, in decorative arts, in package production, and in the fabrication of consumer articles.

The study of macro-molecular materials is carried on in Czechoslovakia by a score of specialized research institutions and by a number of research laboratories in various enterprises.

The consumption of plastic materials is constantly increasing. To cope with this growing consumption, the Czechoslovak plastic production industry will be four times greater in 1965 than it was in 1957. Production of polyvinylchlorides (PVC) will increase several times and will include two types: emulsion and suspension. Production of vinylchloride polymers, of polyvinylacetate, and of polystyrene will be established on a broader base. New factories will be built to produce polyethylene, polypropylene, polyvinylbutyral, and polyisobutylene. As for phenoplasts, the manufacture of laminated materials with melamine surfaces and of technical resins will be considerably augmented. Among aminoplasts, the production of molding powders and pastes for the wood-

work industry will be increased several times.

A new factory for caprolactams will be built and the production of polyamide plastics increased. Production of epoxides and veneer resins will be multiplied four times, thanks to new construction. A new factory will be built for silicones and a whole series of products, including silicone rubber. Of the fluorine-plasts, teflex and teflon will be manufactured. Among the newest plastic materials to be manufactured are formic polyaldehyde and polycarbides.

## CZECHOSLOVAKIA

### Manpower Utilization in the Machine Industry

The utilization of manpower is still making slow progress in the machine industry. In heavy industry the work coefficient is to be increased by 1965 to 1.69 (compared to 1.44 in 1960); with workers operating machines, from 1.66 to 1.93. In the general machine industry the work coefficient of all workers is to be increased from 1.33 to 1.72; with workers operating machinery, from 1.84 to 1.92. A good example of improved utilization of manpower and basic funds is seen in the plants of the association Stredni Nakladni Automobily (Medium-Sized Trucks), where last year the utilization coefficient went up to 1.42; in the course of the year 33% of all workers were transferred to the second shift. The utilization of machinery expressed in the value figures increased to 82% in the fourth quarter of 1960. The plants released a total of 1107 machines and equipment, with a purchase value of 22,662,000 Kcs. Out of this, machines with a total value of 7 million Kcs were cleared; by their re-sale 4 million Kcs were obtained for new investment purchases. The plants of the Association were entitled to further construction, but thanks to the introduction of another shift a total of 9487 m<sup>2</sup> was made available; this exceeded the requirements of the individual plants. The workers of the plants belonging to the Association solve the introduction of the two-shift operation along with all other problems, especially the problem of transportation to work, two-shift boarding, medical assistance, nurseries, etc.

(Prague, Hospodarske Noviny, No 19, 12 May 61, page 3.)

## CZECHOSLOVAKIA

### New Forms of Catalysts for the Polymerization of Caprolactams

A group of scientific workers of the Institute of Macromolecular Chemistry of the Academy of Sciences of Czechoslovakia has succeeded in discovering new forms of catalysts for the polymerization of caprolactams. The product of the new process is nearest the polyamides in its property of highest possible molecular weight, just as, for example, Swiss high-molecular grillon [?] is. The peculiarity of the new process lies in its high reaction speed, which makes possible the application of a relatively low temperature in the manufacture of polyamides. Czech scientists have drawn technological applications from this; they open new paths for the production and application of polyamides. Particularly interesting are the patented processes whereby polyamide moldings of apparently unlimited thickness can be produced free of tension. This procedure is involved in adiabatic polymerization, that is, one in which the polymer is formed from the basic substance in thermally isolated containers (molds). The material is polymerized under such conditions that the final temperature never exceeds the melting point of the polymer. Consequently, a hard casting is obtained directly in the mold from the caprolactam monomer.

According to further patent announcements, innumerable polyamide sections can be continuously injected; instead of the polymer, the monomer with the new highly effective catalysts is fed directly into the injector. By this means the short step to the injector is entirely sufficient for polymerization.

Institute of Macromolecular Chemistry, Prague 6.

(Geneva, Technique et Commerce Est-Ouest, Vol VII, No 34, March 1961, page 45)

EAST GERMANY

LEIPZIG SPRING FAIR 5-14 MARCH 1961  
FAIR PREVIEW: MACHINE TOOLS

Following is the translation of an article by Engineer  
B. Hopfe in Maschinenbau (Machine Building), No 2,  
Berlin, February 1961, pp 85-86.

This year also the people's machine tool industry exhibits, besides the proven standard machines, a considerable number of continuing developments and new constructions. In order to make it possible for the Fair visitor to find quickly the machines interesting him a description is here given of the exhibition program of the Machine Tool Administration.

1. Lathes

VEB (Volkseigener Betrieb -- people's factory) Grossdrehmaschinenbau "8 May", Karl Marx-Stadt

Lead- and draw spindle lathe DLZ 500 E IV x 1500,

Draw spindle lathe DZ 500 E/IV x 1500,

Lead- and draw spindle lathe DLZ 630 E IV x 1500 with pre-selection speed change.

These machines are enclosed in cabinets and are extensively unified.

The same factory also exhibits:

Turning- drilling- and cut-off lathe DBA 125 x 400 (new construction).

VEB Werkzeugmaschinenfabrik Magdeburg

Turret lathe DXKH 63 x 800, with feed mechanism, including feed indicator and turnover tool holding mechanism (continuing development).

Chuck lathe DFK 250. This front lathe is a new development in which there will be great interest.

VEB Werkzeugmaschinenfabrik Zerbst

Facing lathe DP 1600 x 2000 (new construction).

Facing lathe DXP 800 (continuing development).

VEB Grossdrehmaschinenbau "7 October", Berlin-Weissensee

Circular two-stand lathe DKZS 2500 x 1250 with taper cutting



with crowned ram equipment.

Mill cutting hobbing machine for curve-toothed bevel gears (circular arch) ZFTKK 500 x 10. This new development is an additional member in the series of strongly unified bevel gear cutting machines.

#### 4. Planers

##### VEB Werkzeugmaschinenfabrik Aschersleben

Open side planer with gear box drive, model HES 1250/II/3000. This machine is equipped with two transverse and one side support.

##### VEB Maschinenfabrik "John Schehr", Meuselwitz

Vertical ram planer, StS 180. There will be shown as extra equipment a raiseable round table and a file- and saw attachment, Horizontal internal planer, RWI 5 x 1120.

#### 5. Drilling machines

##### VEB Werkzeugmaschinenfabrik Saalfeld

Box stand drill press, BK 25, with automated spindle stock (new development). The machine is equipped with a mechanical tool remover and a round switch table.

Box stand drill press BK 25 with a quick change table as standard equipment.

Multiple-spindle drill press with adjustable spindles in spindle holders, BMG 25. This continuing development has switchable individual drives with indicators.

Gang type individual drill presses with six drilling units, EB 63. Four units work horizontally, two vertically.

Gang type table drill presses, BTR 4 x 10, with tapping attachment on the fourth spindle.

Box stand drill press, BK 63, with cross table.

##### VEB Mikromat Dresden

Coordinate drill press BKO 315 x 450, with optical measuring attachment.

Coordinate drill press BKOZ 800 x 1250.

##### VEB Werkzeugmaschinenfabrik Berggiesshuebel

Tapping machine, GI 4m.

Tapping machine, GAI 4. Capacity about 1000 pieces/hour,

Tapping machine, GI 16/II L, for right-hand and left-hand tread screws.

VEB Berliner Werkzeugmaschinenfabrik

Precision radial drill press, BR 80 x 3150, with supplemental ground plate, angle drill table and turn-around device.

VEB Werkzeugmaschinenfabrik UNION, Gera

Horizontal boring- and milling machine (short-bed development) BFT 100/III with optical precision measuring attachment.

VEB Werkzeugmaschinenfabrik Vogtland, Plauen

Threesided horizontal precision drill press BWX.

The above mentioned plant is equipping its machines with a number of standard units:

Milling attachments with cross-slot support and bed underpart;

Multiple spindle composition machine, mechanical, 3.5 kw.;

Composition machine for boring, hydraulic, 15 kw.;

Composition machine for precision boring, hydraulic;

Composition machine for drilling with guided tool, mechanical.

Six single-spindle units with drive for drilling and partially also for tapping, 0.25...14 kw.

6. Grinders

VEB Schleifmaschinenwerk Berlin

Internal grinding automat, SIA 12.5, with automatic feed (new construction),

Anti-friction bearing, internal groove grinding automat SWaIR 125, with automatic feed (new construction).

VEB Schleifmaschinenwerk Karl Marx-Stadt

Universal circular grinder, SU 125 x 400, with electric measuring attachment and electric control attachment (bridle measuring implement);

Universal circular grinder, SU 200 x 800, with attachment for internal grinding, three-way adjuster, radii adjuster and supporting implement;

External circular grinder SA 200 x 630 (continuing development) in special completion as a wholly automatic, single machine. The grinder is equipped with a reinforced grinding block, with a automatic hydraulic adjuster for repetitive work, electric measure- and control attachment, automatic feed attachment, magazine and transport attachments, and a magnetic automatic filter.

VEB Fraes- und Schleifmaschinenwerk Leipzig

Centerless external grinding automat, SAASL 125 x 200, with

automatic feed mechanism. The machine is equipped for grinding valve rings;

Centerless grinder for grinding of taper rollers, SWaAKM 25, with automatic feed mechanism for grinding of taper rollers by the passage method.

VEB Mikromat Dresden

Horizontal flat-grinding machine SFW 250 x 1000 with measurement control;

Optical profile grinder, SWPO 50, with projection attachment;  
Special double-level grinder SFXDPW 2-12.

Watan- und Zimmermann Werke AG., Glauchau

Internal circular grinder with attachment for level grinding  
SIP 500 x 710.

VEB Werkzeugmaschinenfabrik Naumburg

Vertical draw grinder, SZS 200 x 500 E (new development). This machine is a special design with a hydraulically moving cross-table and time- and measurement control for semi-automatic work. The machine has standard components and is available in various designs.

Two-disk lap- and draw-grinding machine, SLZAZ 800 (new construction). The machine can lap cylindrically, level and level-parallel and draw-grind level-parallel.

VEB Werkzeugmaschinenfabrik Saalfeld

Circular-blade saw and grinder SWSK 800.

VEB Werkzeugmaschinenfabrik Auerbach

Precision parting grinder automat, STAXG 125 x 500. The machine is used for cutting germanium with a diamond rimmed disk.

7. Plastics shaping machines

VEB Pressenwerk Freital

Injection-and-casting automat, Ku ASY 40. Maximal injection capacity 60 cm<sup>3</sup>,

Injection-and-casting automat, KuASY 250 (continuing development). Maximal injection capacity 475 m<sup>3</sup> (continuing development),

Injection-and-casting automat, KuASY 400. Maximal injection capacity 1000 m<sup>3</sup> (continuing development).

machine. The glass jar lids shaped on the crank press are automatically lead to the thread pressing automats and are there flanged;

Cask covering machine (horizontal), KEVFW 630 (new construction). This machine simultaneously puts both the bottom and the lid on casks;

Strip shears, ScStr 0.5 x 300, with variable regulation of cutting speed.

#### VEB Werkzeugmaschinenfabrik Aschersleben

Crank and plate shears with parallel drive, ScTP 16/3150,

Two-stand crank press with two rods PKZZ 200/2500.

### 9. Profile forming machines

#### VEB Werkzeugmaschinenfabrik Bad Dueben

Thread rolling machine, GXWR 80 (M) with magnetic feed for rolling of tack screws.

#### VEB Dratziehmaschinenwerk Gruena

Hot wiredrawing machine, UDZGW VIII/8, for drawing of molybdenum wire of 0.5 mm diameter or less;

Multiple wiredrawing machine, UDZGW III/10, for drawing of copper wire from 3.5 mm to 1.3 mm diameters;

Portable point rolling machine UDSp II for making points on copper tacks;

Portable header, UDE III, for heading of copper tacks.

#### VEB Kaltverformungsmaschinenwerk Karl Marx-Stadt

Header automat for wire nails PAST 4 (continuing development). The machine is equipped to head two wires, capacity up to 1000 pieces/minute,

Two-step header automat with matrix, PAZM 10;

Bolt head-forming apparatus PAFB 10.

#### VEB Drahtwebstuhlbau Neustadt-Orla

Wire-netting soldering automat, UDANS 1 x 2275 (continuing development);

Wire weaving machine, UDWZ 0.04 x 1000, with exchangeable batten;

Cloth shears ScS 28.

## HUNGARY

### PRODUCTS OF THE BUDAPEST TRANSMISSION MACHINE FACTORY

Following is the translation of an article by Alfred Schnell in Gepgyartastechnologia (Machine Production Technology), Vol 1, No 1, Budapest 1961, pages 11-12.<sup>7</sup>

Two groups of young engineers and technicians, each composed of 30 members of the Scientific Society of Machinery, visited the Budapest Transmission Machinery Factory. The factory's products range from dwarf transmission machines (TM) to eight-ton units, which have a 1250 mm axle base. They also make combines, tractors, mine locomobile TM-s and other multigear speed-boxes in series. Cog-wheel pumps, suitable for low and high pressure work, for various liquids and various capacities, are also being made here in series. One section makes only cog-wheels, both custom-made and in series.

The main product is of course the standard TM, for which this factory is supposed to cover all domestic needs. Up to very recent times these machines were made almost invariably individually (i.e. not in series) and there were 2-3000 types and sizes to choose from. The older standards were not satisfactory any more, and therefore standardization was put on a new basis here in 1956. This entailed ten types of TM series. Through such standardization measures the horse-power/kg ratio was improved by 80%.

The ten series consist of 1501 TM types of various sizes and arrangements. They require 57 kinds of boxes ( housings) and contain 23,330 chipped parts -- which are of 972 kinds. Hence one part occurs 24 times on the average. The total part number of the 1501 TM-s is 98,823, which stands for 1105 types. Hence the type number is only 1.12% of the number of the parts.

The 1501 TM-s have 8,702 bearings. These are divided into 57 types. The number of the bearing bores was reduced to 26. This means that only 26 kinds of boring tools and bore measuring tools are necessary.

If we examine the standardization data of the East German TM-s, as was shown on the Leipzig Fair, we see that our standardization encompasses a larger area from a certain point of view, although this area is not so uniformly filled as far as series and arrangement types and axle-base sizes are concerned.

The old low-, medium-, and high-pressure pump series of the factory were not modern in many respects. Therefore in 1960 development of new pump series was started. The new pumps have newer constructions and considerably better efficiency, carrying capacity, and a better HP/kg ratio. They are less noisy, run smoother and have a significantly better uniformity degree. They also fit better into

the principles of series production, for the main parts of the pumps can be used for several types. The most important progress was achieved in the medium- and high-pressure types, where a very large weight reduction was achieved. Efficiency jumped from 40% to 75% in the new prototypes. The weight reduction is most significant in the high pressure pumps. While our old 50 atm pumps weighed 1.2-4.6 kg per liter carried per minute, the new 63 atm pumps have a 0.3-1.1 kg index.

These high efficiency pumps opened a new field since they are reversible. They can be operated without any change as hydromotors. Hence they can be used at places where special rpm-s are needed (either different from the synchronized rpm-s of electrical motors or very high rpm-s) where rpm regulation is of advantage and where a relatively high capacity motor has to be installed in a relatively small place. It can also be used as explosion-safe propulsion. For instance, one of these pumps, whose weight is only 30 kg, gave 16 HP on the testing bench, 70% gross efficiency at 2,450 rpm.

Pumps for the transportation of various foods and chemicals are also being made, along with oil pumps. Several prototypes designed for milk pumping are already built into "Ikarus" milk trucks.

We saw various types of production: in the case stable TM-s, custom as well as small series production; in the case of combines and U-28 tractors, medium series production. We did not see the tractor assembly line, for this phase of the work is being done at the Albertfalva (district of Budapest) and not at the Fehervar Road plant. While neither the combines nor the tractors are automatically assembled yet, important steps have been taken toward this goal.

Toothing is done generally with the gear-hobbing machine. The large TM-wheels are made of materials having 85-100-105 kg/cm<sup>2</sup> tensile strength.

The factory has two new original Pfauter machines (P-630 and P-1250) which have twice the cutting speed of old Pfauter machines, even with these high-tensile materials. This is due to their vibration-free operation. Lack of vibration lengthens the life of the cutting edge considerably. Further knife edge increase can be achieved by diagonal milling, for which these machines have special features.

Diagonal milling means that when the wheel moves axially, the cutting edge does so too, simultaneously. The vector of the two motions is a diagonal and the cutting edge itself describes a diagonal motion. Naturally, the differential gear, which controls the table drive, gets another auxiliary motion, aside from the necessary auxiliary motion due to angularly cut teeth. Hence, during the time that is taken up by milling the width of the wheel, the cutting edge places move constantly through the whole length of the cutting machine -- i.e. it travels through the rack-type gear cutter. This means that milling wear does not appear at one place only as in the old methods, but is distributed through the whole width of the milling machine. Since in general the hob wear appears on the one-third point of the milling machine, this method triples the lifetime of the cutting edge.

Molybdenum sulfide lubricates the C 60 N and C 60 V materials

which are very difficult to work with (due to their niobium and vanadium content they are very hard). The molybdenum sulfide paste is rubbed on the cutter after sharpening and is mixed into the coolant. This increases the life of the cutting edge, for the molybdenum sulfide gives complete protection against high surface pressure and excessive temperatures. There are large TM wheels whose milling required four-five sharpenings during their manufacture. Milling cannot be interrupted for sharpening at the finishing cut because this would leave a track on the surface. The combined efforts of the diagonal method and molybdenum sulfide lubrication gave surprising results for these wheels. With these methods we don't have to send the wheels to Austria for grinding. This alone means a saving of \$1,000 per pair.

Copying lathes, made in the Soviet Union and East Germany, were demonstrated. These lathes decreased the manufacturing time of combine and tractor TM axles by ca. 60%. Cog-wheel cold drawing was demonstrated as a technological curiosity. The method is being experimented with for larger objects. According to present possibilities, cog wheels from the smallest size up to 70 mm in diameter and 3 moduli can be drawn in fibers. This would decrease production costs to 10-20% of their present level. Presently only "D" and occasionally a "C" accuracy is obtained by them, but a group of young engineers is working on the problem. A constant "C" can shortly be expected.

They can draw splined shafts with allowance for grinding, which reduces the costs greatly at lathe and at wholly splined gearbox manufacturing.

The company has three instrument rooms. In one there are cog wheel devices, in the main one are all the fine precision instruments, and in the third one are the instruments solely for testing the gear hobbing machines. This room has instruments for noise elimination of milling machines.

The factory produces special gear hobbing machines according to an entirely new principle. To test them, a Fette-system gear-hobbing machine testing instrument was purchased. The instrument tests the accuracy of the machines with 18 measurements, according to the new DIN [German] and GOST [Soviet] standards. The accuracies that were graded "A" in the old system (tested in the medium plane with a microscope) are only a weak "B" in this instrument. This is because in the old system the milling profile was made straight line in the medium plane and the measuring was done accordingly. Correct measurement should show a straight profile in the so-called base cylinder's tangential plane.

The factory is rearranging all three chipping plants in 1961 to handle increased orders. This will facilitate intra-factory transportation and cooperation.